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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/926,033	11/07/2001	Takeshi Oohashi	011022	3978

23850 7590 11/24/2003

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EXAMINER	
THORNTON, YVETTE C	

ART UNIT	PAPER NUMBER
1752	

DATE MAILED: 11/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/926,033	Applicant(s) OOHASHI ET AL.	
	Examiner Yvette C. Thornton	Art Unit 1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 September 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

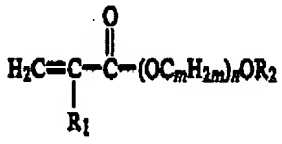
This is written in reference to application number 09/926033 filed on July 7, 2001 which is a 371 of PCT/JP00/01221 filed on March 2, 2000.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

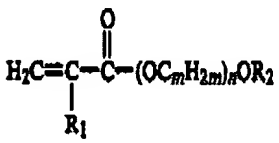
2. Claims 1, 4-13, 16-18 and 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Lipson (EP 128014 A2). Lipson teaches a photopolymerization composition comprising (A) from 10-60 parts by weight (pbw) of an addition polymerization material comprised of (i) from 5-50 pbw of an acrylate of the formula:



wherein m is 1-4, n is 1-12, R1 is H, CH3 and mixtures thereof and R2 is selected from a substituted or unsubstituted phenyl, substituted or unsubstituted naphthenyl, a branched, unbranched, substituted or unsubstituted alkyl having 1-12 carbons, or a substituted or unsubstituted cycloalkyl group having 5-6 carbon atoms in the ring; and (ii) from 5-50 pbw of one or more non-gaseous compounds containing at least two terminal ethylenic groups and having a boiling point of 100°C; (B) from 0.001-20 pbw of a photoinitiated free radical generating addition polymerization initiating system; (C) from 0.001-5 pbw of a thermal addition polymerization inhibitor; and (D) from 40-90 pbw of a preformed macromolecular

polymeric binding agent which is a polymer of (i) a first monomer material which contains one or more non-acidic compounds and (ii) a second monomer material which consists essentially of one or more ethylenically unsaturated carboxylic acid or anhydride containing monomers having 3-15 carbon atoms (see claim 1).

Example V exemplifies a composition comprising a copolymer of methyl methacrylate (35%), butyl methacrylate (11%), styrene (23%) and methacrylic acid (30%) in a solvent mixture of methyl ethyl ketone/isopropyl alcohol. It is the examiner's position that the said copolymer meets the limitation of a carboxyl group containing binder, which contains styrene or a styrene derivative. The said copolymer further meets the limitations of the instant claims 4, 16 and 21 wherein the methyl methacrylate (35%) and butyl methacrylate (11%) together meet the requirement of claimed monomer (III) in the amount of 30-75%. The composition of Example V further comprises phenoxydiethoxyethyl acrylate, which has the formula

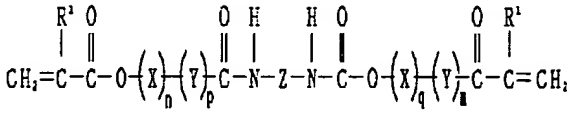


wherein m=2; n=4; and R2=unsubstituted phenyl group. Although Lipson fails to exemplify a compound wherein n is anything other than 4, one of ordinary skill in the art would have readily envisaged each and every compound within the taught range of n=1-12 (pg. 7, l. 6-pg. 8, l. 10). It is the examiner's position that when n is in the range of 6-12 it anticipates the claimed range of the instant invention. Lipson teaches that the preferred acrylates are substituted and unsubstituted phenoxypolyethoxyethyl acrylates and substituted and unsubstituted phenoxypolypropoxypropyl acrylates (pg. 9, l. 10-19). The substituents for the phenyl or naphthenyl groups are selected such that they do not

substantially adversely affect the characteristics of the photopolymerizable composition and may be halogen (Cl, Br, I) groups, C1-15 alkyl groups and C1-15 alkoxy groups (pg. 8, l. 5-10). Examples of the substituted phenoxypolyethoxyethyl acrylate include chlorophenoxypolyethoxyethyl acrylate and methacrylate (pg. 8, l. 24-25).

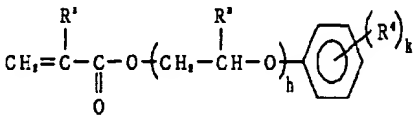
The composition of example V was coated onto a polyester film, dried and covered with a polyethylene film (pg. 35, l. 5-pg. 36, l. 30). The polyethylene cover film is removed and the bared resist coating is laminated to a clean copper-clad epoxy fiberglass board. The resulting film is exposed to light through a high-contrast transparency. The polyester support film is peeled off and the exposed resist layer is developed and etched (pg. 28, l. 17-pg. 29, l. 24).

3. Claims 7-11, 14-15, 18-20 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishikawa (JP 10-020491 A, machine translation). Ishikawa teaches a photosensitive resin composition comprising (A) a film forming polymer of (meth)acrylic alkyl esters and alkyl methacrylate ester, (B) a photopolymerization initiator, (C) a compound of general formula (I):



(I)

and (D) a compound of general formula (II):



(II)

(see claims; p. 0005-0006). X of formula (I) is -CH2CH2O; Y is selected from 6 different C3-6 alkoxy groups; Z is a hydrocarbon group having 2-16 carbon atoms; and n, m, p and q are an integer from 1-14. (p. 0005). It is the examiner's position that X and Y together meet the limitations of B1

and B2 of claimed formula II. In taught formula (II), h is 3-20; R2 is hydrogen or a methyl group; R3 is hydrogen or C1-4 alkyl; R4 is C4-14 alkyl group; and k is 1-3. It is the examiner's position that when h is 6-18, taught formula (II) clearly anticipates claimed formula (V) and (VI). Suitable examples of the taught photopolymerizable initiator (B) include aromatic ketones, benzoin ethers, 2,4,5-triarylimidazole dimers and acridine derivatives (p. 0011). The taught composition is coated onto a substrate and dried to form a photosensitive film. The said film was covered with a protective film and laminated to a copper substrate. The film is irradiated through a negative or positive mask pattern and developed to form a resist pattern (p. 0018-0020).

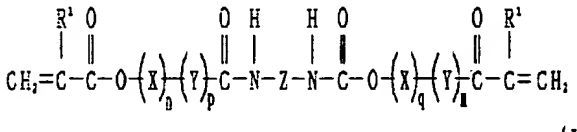
Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

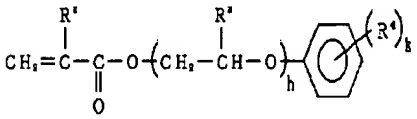
5. Claims 2-3, 14-15 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lipson et al. (EP 128014 A2) as applied to claims 1, 4-13, 16-18 and 21-23 above, and further in view of Ishikawa et al. (JP 10-020491 A, machine translation). Lipson as discussed above teaches all the limitation of the instant claims except it fails to teach and/or suggest the use of a 2,4,5-triarylimidazole dimer as set forth in instant claims 2, 14 and 19. Lipson also fails to teach the use of a compound of formula (II) as in instant claims 3, 15 and 20. Ishikawa teaches a photosensitive resin composition comprising (A) a

film forming polymer of (meth)acrylic alkyl esters and alkyl methacrylate ester, (B) a photopolymerization initiator, (C) a compound of general formula (I):



(I)

and (D) a compound of general formula (II):

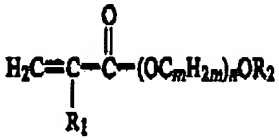


(II)

(see claims; p. 0005-0006). X of formula (I) is -CH2CH2O, Y is selected from a 6 different C3-6 alkoxy groups, Z is a hydrocarbon group having 2-16 carbon atoms and n, m, p and q is an integer from 1-14. (p. 0005). It is the examiner's position that X and Y together meet the limitations of B1 and B2 of claimed formula II. One of ordinary skill in the art would have been motivated by the teachings of Ishikawa to incorporate a compound of general formula (I) into the taught composition of Lipson in order to increase the sensitivity, intensity and elongation of a the hardened film (see Ishikawa p. 0015).

Ishikawa also teaches that suitable examples of the taught photopolymerizable initiator (B) include aromatic ketones, benzoin ethers, 2,4,5-triarylimidazole dimers and acridine derivatives (p. 0011). It would have been obvious to one of ordinary skill in the art to use any photoinitiator, such as 2,4,5-triarylimidazole dimers, which are well known and conventional in the art in the composition of Lipson.

6. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lipson et al. (EP 128014 A2) as applied to claims 1, 4-13, 16-18 and 21-23 above, and further in view of Kawashima (US 6048953 A). Lipson as discussed above teaches all the limitation of

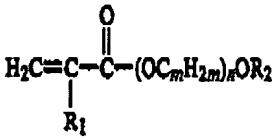
the instant claims except it fails to teach and/or suggest a composition further comprising 2,2-bis[4-(acryloxypolyethoxy)-phenyl]propane or 2,2-bis[4-(methacryloxypolyethoxy)phenyl]propane as set forth in instant claims 24-26. Lipson does however teach that the taught addition polymerization material comprises (i) from 5-50 pbw of an acrylate of the formula:  and (ii) from 5-50 pbw of one or more non-gaseous compounds containing at least two terminal ethylenic groups an having a boiling point of 100°C. Example of the non-gaseous compounds include ester of the methylene carboxylic acid such as diethylene glycol diacrylate and bis-acrylates and methacrylates of polyethylene and polypropylene glycols such as tripropylene glycol diacrylate (c. 5, l. 60-c. 6, l. 16).

Kawashima (US 6048953 A) teaches the use of a (meth)acrylic monomer (B) having at least one unsaturated double bond in its molecule to adjust the viscosity and the curability of the solvent-less liquid resin composition. Examples include diethylene glycol di(meth)acrylate, tripropylene glycol di(meth)acrylate, 2,2-bis[4-(acryloxypolyethoxy)phenyl]propane and 2,2-bis[4-(methacryloxypolyethoxy)phenyl] propane. It is the examiner's position that Kawashima serves to equate 2,2-bis[4-(acryloxypolyethoxy)phenyl]propane, 2,2-bis[4-(methacryloxypolyethoxy)phenyl]propane, diethylene glycol di(meth)acrylate and tripropylene glycol di(meth)acrylate in the art. Therefore, one of ordinary skill in the art would have been motivated to substitute 2,2-bis[4-(acryloxypolyethoxy)phenyl]propane or 2,2-bis[4-(methacryloxypolyethoxy)phenyl]propane

for the taught diethylene glycol diacrylate and tripropylene glycol diacrylate of Lipson and expect reasonably similar results.

Response to Arguments

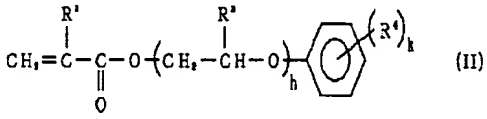
7. Applicant's arguments filed September 22, 2003 have been fully considered but they are not persuasive. Applicants argue that the prior art reference of Lipson fails to anticipate the claimed invention because it fails to exemplify a compound wherein n is 6-12. The examiner is of the position that Lipson clearly teaches an acrylate of the formula:



wherein m is 1-4, n is 1-12, R1 is H, CH3 and mixtures thereof and R2 is selected from a substituted or unsubstituted phenyl, substituted or unsubstituted naphthenyl, a branched, unbranched, substituted or unsubstituted alkyl having 1-12 carbons, or a substituted or unsubstituted cycloalkyl group having 5-6 carbon atoms in the ring. Example V exemplifies a compound wherein m=2, n=4 and R2 is an unsubstituted phenyl group. The compound of example V is a preferred embodiment. Lipson further teaches that the preferred acrylates are substituted and unsubstituted phenoxypolyethoxyethyl acrylates and substituted and unsubstituted phenoxypolypropoxypropyl acrylates (pg. 9, l. 10-19). In light of the exemplified composition and the disclosure of Lipson, one of ordinary skill in the art would readily envisage a compound similar to that of example V wherein n is in the range of 6-12 and the phenyl is substituted or unsubstituted, which clearly anticipated the claimed invention. Applicants argue that the number of possible choices of Lipson is vast. While this is true, the examiner maintains the position that in light of the preferred embodiments of

the taught invention, one of ordinary skill would envisage compounds of the claimed invention.

8. Applicants further argue that the prior art reference of Ishikawa also fails to exemplify acrylate compounds with repeating units of 6 or more. Ishikawa clearly teaches a compound of general formula (II):



(II)

(see claims; p. 0005-0006)

wherein h is 3-20; R2 is hydrogen or a methyl group; R3 is hydrogen or C1-4 alkyl; R4 is C4-14 alkyl group; and k is 1-3. It is the examiner's position that when h is 6-18, taught formula (II) clearly anticipates claimed formula (V) and (VI). While Ishikawa fails to exemplify each and every point of the taught range of h, the majority of his taught range falls within the limitations of the claimed invention (i.e., h=6-18).

9. The examiner reminds the applicant that requirement under 35 USC 102 does not require the claimed invention to be exemplified by the prior art.

10. In regard to the rejections set forth under 35 USC 103, applicants argue that surprising and unexpected results from compounds within the claimed range. The declaration filed under 37 CFR 1.132 has been fully considered by the examiner and found to be not commensurate in scope with the instant claims. The said declaration only provides examples of a substituted phenoxy group. However, the claims as written encompass both unsubstituted and substituted phenoxy groups.

11. Applicants have also failed to compare the closest prior art of Lipson and Ishikawa. The declaration uses the composition of example 1 of the present specification with varying acrylate compounds. The examiner was unable to make a direct comparison of the claimed

invention and the prior art. A better comparison would have been to make the composition of example V of Lipson and vary the acrylate component. Furthermore, the composition of the said declaration comprises applicants preferred components such as 2-(o-chlorophenyl)-4,5-dipenylimidazole dimer, which may produce enhanced results.

12. The examiner notes that a declaration under 37 CFR 1.132 is not effective to overcome a rejection set forth under 35 USC 102.

13. The examiner maintains the rejection of record.

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

15. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette C. Thornton whose telephone number is 703-305-0589. The examiner can normally be reached on Monday-Thursday 8-6:30.

17. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F. Huff can be reached on 703-308-2464. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

18. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1495.

yc
November 20, 2003

MARK F. HUFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700